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ABSTRACT

An inquiry-based early childhood education (ECE) program focusing on the development of representational competence, guided by principles from Piagetian theory, and based on Sigel's (1970) distancing hypothesis is described, and issues of program evaluation are discussed. Principles and aims of the ECE program are stated, including, among others, the ideas that representational competence develops fully only through a process of discrepancy resolution. Basic classroom strategies assocated with distancing procedures are described. In addition, the discussion offers eight detailed lesson plans used in the program; five are for large group activities with different foci, one is for a small group activity involving the physical construction of book-illustrated structures, and two are for free play activities. Issues related to problems in evaluating the effectiveness of preschool interventions are briefly discussed and a model of an exemplary preschool program is provided. In particular, the discussion explores the place of theory in ECE programs, types of decisions required for establishing a conceptual model, the function of articulated conceptual systems, and, more than briefly, conceptual considerations regarding development. Also considered are program monitoring, appropriateness of evaluation to program development, research relevant to the advocated program and conceptual framework, and perspectives on program evaluation measures and data analysis. (RH)

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On Becoming a Thinker: A Preschool Programme

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Irving E. Sigel, Ruth A. Saunders and Catherine E. Moore

INTRODUCTION

Burgeoning interest in developmental processes has strengthened the ties between education and psychology. One of the major tasks facing educators today is that of integrating theoretical insights into educational programmes. When programme effectiveness is an issue, it is the actual implementation of theoretical principles into classroom routine that counts, not simply the elegance and explanatory power of the theory. A crucial need today is to translate general psychological principles into specific strategies for day to day interactions in the classroom.

In an effort to meet this need, the Child Care Research Centre has been developing and evaluating an inquiry-based early childhood education programme guided by principles from Piagetian theory and based on Sigel's distancing hypothesis. This programme includes a detailed set of teaching strategies, a description of classroom organisation and materials for enhancing children's problem-solving ability, learning to think in symbolic terms and understanding of a variety of communication media (e.g. language, art, gesture and dance). The programme has been in operation for several years at SUNY/Buffalo and Educational Testing Service (ETS). Now ETS offers a series of workshops designed to help practitioners master the techniques developed here.

*'Focus of the programme: representational competencies', 'Examples of lesson plans used in the programme' and 'Place of theory in early education programmes' are written by Ruth A Saunders, Catherine E. Moore and Irving E. Sigel respectively.

FOCUS OF THE PROGRAMME: REPRESENTATIONAL COMPETENCE

The major focus of the programme is in the area of representational competence. This is a broad term covering abilities in two major areas: (1) in the use of internal mental signs or symbols (ideas) to represent real objects and experience, and (2) in the use of a variety of external physical objects such as pictures or sound patterns (words) to stand for other real objects.

The first of these is what might be referred to as thought proper. It is more than having mental labels for what we see or do and being able to remember them on occasion. It includes a whole set of connections between ideas and methods for putting ideas together. In thinking, we *represent* real things, and we use a coherent *system* for doing so. If we think about rearranging a room, for example, we not only have to imagine tables, chairs, etc. but also mentally move them around and examine the consequences of the changes.

The second kind of ability included in representational competence involves both the comprehension of the media in which knowledge is presented (understanding external representational systems such as language or art) and an understanding that the same idea can be communicated in various ways. The latter understanding can be termed 'conservation of meaning' because of its relationship to other kinds of conservation in the Piagetian system. A child who conserves meaning can, for example, treat a photograph of a dog, a toy dog, the word 'dog,' and a schematic drawing of a dog all as representations of the actual three-dimensional dog. Though their visual qualities differ, the representational function of each of these objects is the same.

Conservations of meaning seem to emerge earlier than some of the conservations of mass, weight or volume that have been studied. One reason is that the child has a wealth of experience with objects presented to him in various media. Exposure alone, however, is not sufficient for such an understanding. The child has to have exposure to, and engagement with, experiences which facilitate his increasing awareness that meanings are not found solely in the media (the medium is not *all* of the message), that ideas can be presented in various forms and still retain their basic meaning, and the child himself can transform the form in which the meaning is presented. For example, a four-year-old can represent a dog by acting like a dog, drawing a picture of a dog, or pointing to a picture of a dog. Later he will be able to write the word 'dog'.

One might think of the two parts of representational competence as reflecting the difference between talking to oneself and communicating something to others. We use one aspect of representational competence to tell ourselves about the real world (to think about clouds, people, fish, bricks, etc.) and another aspect of it to communicate with others about the world and various representations of it.

GENERAL PRINCIPLES AND AIMS

A number of general principles concerning representational competence guide the preschool programme. The first three establish the basic aims of the programme.

Principle 1: *Humans understand their world through their representations of it.* Thus both aspects of representational competence are adaptive. The first, a well developed representational system enables one to learn from experience. It allows us to use past experience in guiding the adoption of behaviours and beliefs which are well suited to the world we live in. The second, an understanding of external representational systems and their relationships to one another via their representational functions (i.e., conservation of meaning), enables one to learn from the experience of others and to contribute to the knowledge of others by communicating one's own experiences.

Principle 2: *Representational competence develops.* It is neither fully with us at birth nor does it suddenly make an appearance, for example, at puberty. It develops in a sequence of predictable steps with observable outcomes.

Principle 3: *Representational competence develops fully only in response to interactions with the appropriate physical and social environments.* Development can occur in poor environments as well as in good ones but, like good nutrition, good education enhances the growth process and positively affects the outcome.

These three principles point out two major aims for the educational environment. First, we want to create an environment whose physical and social components help the child to refine, elaborate, and extend his or her own internal representational system. Second, we want to help the child understand and use external representational systems. That is, we want to foster the child's developing abilities and we want to instil habits of using these abilities.

How can we create such an envirnment? What will it look like? Three additional principles guide our answer to these two questions.

Principle 4: *Representational competence develops through a process of discrepancy resolution.* Discrepancies come in a variety of guises, all of which share the characteristic that something does not 'fit' with something else. For example, a new piece of information may not fit with our present theory or two facts may seem to contradict directly one another. Three major types of discrepancies can profitably be put to use in our work with children (Sigel and Cocking, in press). These include:

(1) a mismatch between an internal event and an external event – e.g. one's wishes are not fulfilled by the real world or one's theory is not confirmed by the evidence at hand;

(2) a mismatch between two internal events – one recognises that the satisfaction of one wish precludes the satisfaction of another or two parts of our theory contradict one another;
(3) a mismatch between two external events – e.g. ice feels cold but dry ice feels hot.

We resolve such discrepancies by constructing (or, in some cases, discovering) new generalisations which resolve the discrepancy at hand and which are consonant with our other knowledge. The outcome of discrepancy resolution has two major benefits: (1) our generalisations theories, explanations, etc. apply to larger and larger chunks of the world as we extend them to include new information, and (2) our generalisations fit the world more accurately as we revise them in the light of new evidence.

Principle 5. *Representational competence develops only if the child is actively involved in the process.* Discrepancies must be seen and resolved by the child. We can help but we cannot do it all. There are two factors which make this so. First of all, there is a methodological limitation. Since we have no way of actually seeing what is in the child's head, we are forced to rely on the child's reports and interpretations about what is going on. Secondly, there is a constraint postulated by our theory. Development is a *construction* process, not a soaking in of an external system.

Principle 6: *Discrepancies cannot be perceived by the child if the gap is too wide.* To see a discrepancy, the child must have the necessary apparatus in his representational system to be able to represent the two situations and the relation between them. He may also need some experience in the subject matter before he can see that a discrepancy exists. For example, it may not seem strange that a platypus both has fur and lays eggs if I don't know anything about mammals and birds. Finally, a child is not likely to perceive a discrepancy unless he is attending to the relevant information – unless he is interested and motivated.

These principles tell us that (1) we have to make discrepancies visible to each child (2) we have to help children find their own discrepancies to resolve and (3) we have to help children find ways to resolve the discrepancies themselves. Furthermore, the way we do this will vary for each child depending on his or her developmental level, previous experiences and interests. It is clear that we will not be able to rely on a prescriptive list of teacher behaviours, specific schedules, particular room arrangements and standardised activities. Rather, we will have to rely on some guiding principles, some ways to find out information from the children we work with and a set of ideas from which to select appropriate activities, schedules, etc.. We will have to do as much thinking and discrepancy resolving as we ask children to do. We must demand as much of ourselves as we do of children.

BASIC CLASSROOM STRATEGIES

The creation of an optimal environment for growth in representational competence leans heavily on the concept of distancing. Basically, this concept refers to aspects of the environment which, in accord with principles 1 to 6, stimulate the resolution of discrepancies by the child, foster the acquisition of 'conservation of meaning', and result in the growth of the child's internal representational system. Distancing can occur in verbal strategies, activities and materials, and in classroom management (scheduling, rules, etc.).

In defining distancing, the form cannot be distinguished from the content. Thus, one cannot simply give a list of particular verbal strategies, a list of specific questions which together make up the set of verbal distancing behaviours. Whether or not a particular question has the distancing dimension depends on its effect on the person to whom it is directed – or its potential effect given the appropriate motivational state. This follows directly from principles 5 and 6. A question only stimulates discrepancy resolution if the child perceives the discrepancy. Furthermore, whether or not a discrepancy is perceived depends on the *state of the child* as well as on the particular form and content of the inquiry.

This framework is designed to help one determine when and how to use those behaviours and physical materials which have distancing potentials in ways such that their potentials are realised. Distancing potentials are realised when, through luck and/or knowledge, situational demands are appropriately matched to a child's interests and cognitive abilities. If we can decrease the dependence on luck and increase the knowledge base from which to create appropriate situations, we are way ahead of the game. In general, the teacher's knowledge base will consist of two parts (1) knowledge of each particular child with whom one works and (2) knowledge of strategies and procedures which increase the probability both of finding out how those children think (and what they know) and of activating their thinking processes. Fortunately, many of the same strategies which help us to find out what is in the child's mind also serve to activate the child's thought processes. For example, when we ask the right question, instead of simply telling, we find out what the child already knows *and* we stimulate the child to think about the issue.

Distancing behaviours can be used in all aspects of the preschool environment to *activate the child's thinking*. In addition, they help the teacher find out what the child thinks, how the child thinks, and what interests him. In general, one is using distancing behaviours when one tries to:

(1) Ask questions rather than give statements.
(2) Give real choices – the kind where the child makes the decision and is helped to follow through on it.

(3) Wait, watch, and listen while the child is doing something – let the child solve his own problems and discover the consequences of his action (whenever it is safe to do so).
(4) Be responsive when the child initiates and use questions and suggestions in teacher-initiated interactions. (Avoid being a 'TV teacher'.)
(5) Arrange the physical environment to stimulate problem solving (e.g. create or rearrange materials, resources, space, routines, etc.).
(6) Use distancing behaviours in socio-emotional, ethical, aesthetic and motor skill domains as well as in areas typically called 'cognitive'.

These are important considerations, each of which will be discussed in more detail in the sections to follow.

(1) *Ask questions ... .*

Questions are essentially two-way communications: a question usually gets an answer. But questions can do more than that – good questions foster genuine dialogue. Good questions are reasonable, rational and appropriate rather than mere fillers for silence. Simple 'yes-no' questions or 'guess what answer I'm thinking of' are *not* usually the most beneficial. For example, the questions listed under the 'minimise' column below are to be used as little as possible since they require very little mental activity. The questions listed under the 'maximise' column, however, require more mental activity on the part of the respondent and are likely to be followed up with a genuine exchange of information and opinion.

Maximise the use of questions like these:	*Minimise the use of questions like these:*
Tell me about this (object).	What color is this block?
What might have happened?	What is the first thing that will happen, the second, the third, etc.
What if (state opposite) ...?	Is this a spoon?
Why do you think that?	

Questions can be directed towards the understanding of a concept but throughout such a process, ***any*** answer by the child should be accepted as legitimate – not as an accurate account of reality but as a true reflection of the child's level of thinking and his perception of reality. Follow-up questions are used to help the child move himself closer to more sophisticated understandings. When questions are used to activate thinking, they help the child focus his mental energies on the issue at hand and, in so doing, they help him construct ***for himself*** the relevant concept.

(2) *Give real choices ....*

Posing conflicting issues or alternatives is an important strategy. For example, one might ask:

> 'If I want to boil an egg, should I put it in a pan with water or without water?' or 'Would you rather build a house with blocks or with wood scraps?'

When a child has to choose between two or more alternatives, he has strong motivation for carefully examining each possibility. This is only true if two conditions are met:

(1) the choices must be mutually exclusive (e.g. you cannot eat your cake and have it too); and
(2) there is some consequence of having made the choice. Thus, if a child is asked whether he would like the soup hot or cold and he chooses cold, he should be given it cold. If he is asked to make a prediction, he should be helped to examine why he puts faith in that alternative. He should be allowed to test it and help to relate the results of the test to his prediction.

When these two conditions are met, the child is likely to be *motivated* to consider each option as thoroughly as he can. However, he still needs help in *knowing how* to weigh options. Questions can be used here to help him consider pertinent details, make inferences and relate pieces of information in a way which allows him to make a rational choice.

(3) *Wait, watch, listen ....*

No matter how good the initial question, its value can be lost by not waiting long enough between question and answer, showing approval only for correct answers or accepting answers without posing alternatives. The child needs a chance to concentrate – he must understand the question and he must formulate an answer. This takes time.

When the child has produced an answer, one can ask further questions to determine the conviction with which a child holds the response and to establish the basis for holding that point of view. These aims hold for both correct and incorrect answers. Both teacher and child benefit from such an exchange: the teacher learns more about the child's view and the child examines his own beliefs more carefully. If given a chance to *test his knowledge himself,* the child may even change his beliefs in accordance with the results. When this happens, he has a good reason for holding the new belief – a better reason than one which depends on having been told to believe it by an 'authority'.

The guiding principle here is that whenever it is safe, *let the child discover the consequences of his action himself.* The teacher's role is to

help keep conditions safe for testing consequences and to help the child notice and analyse the consequences. Nonverbal looks, gestures or manipulation of materials may serve as questions which help the child attend to the consequences of his action. Verbal questions, of course, also do their part here.

(4) *Be responsive ....*

A teacher's response to child-initiated questions serves as a model for valuing questions, giving serious thought to questions and turning question asking into a genuine dialogue. A child's plea for information should not be ignored but it does not have to end with a simple statement from the teacher. The teacher can help *the child* solve the problem when strategies like this are used: 'That's a good question; let's figure it out. Is there anything else we know which looks like that when it's wet?'

In many cases, the teacher can help the child devise a way to find the answer to the question. This might involve bringing a snowball inside, asking another child why he is hiding the book or looking on a chart to find out whose turn is next. Questions can be used to help the child think of an appropriate way to get the information. The idea is to free the child from dependence on the teacher – not to be unhelpful or to hide information. For this reason, a good deal of judgement is needed in deciding how much help is to be given and when and how to give it.

In response to a child's question, the teacher engages the child in finding the answer. This is in contrast to the 'TV teacher' who, in an admittedly entertaining and appealing way, takes over the problem and presents its resolution as a completed package.

(5) *Arrange the physical environment ....*

The preschool classroom can be arranged to enhance children's use of problem solving abilities. Blocks near the dramatic play area, for example, lend themselves to use in improvising stoves, beds, etc.. Signs and pictures at children's eye-level enables children to really use them for ideas and information. Activities should be arranged so that potentials for integration are obvious *to the child*. A teacher may remember about the clothspins in the top cupboard but will the child? Keeping materials within children's reach and/or labelling storage spaces with pictures gives children more control over the integration of their play. It also helps them to make full use of the classroom resources in solving their own problems. The key point is to test the effect of the arrangement on children – neither on what adults might do in it nor on adult values and aesthetics.

The material one provides also influence children's full use of their developing mental abilities. Choose materials which lend themselves to a variety of purposes (e.g. sturdy blocks; construction materials like clay, lego blocks, pipe cleaners, etc.; old cans and plastic containers, and so forth) and introduce novel materials to stimulate discussion and explora-

tion. Even stories can be selected for how well they elicit ideas from children. A story like *Good luck, bad luck*, for example, can generate excited discussions of what kind of rescue or what mishap is coming up next.

Routines can also provide ways to involve children in planning and problem solving. Regularity is crucial if children are going to be able to get a feel for how much time they have to work with. A variety of signs (pictures, musical sounds, etc.) can be used to help children know what is coming next.

Finally, to foster children's comprehension of representational media, teachers should take care to illustrate an object or experience shared by the members of the class in a variety of media. Circle time activities can use 3-dimensional models, pictures, photographs, music, and pantomine to communicate stories or express feelings. Children can be helped to use a variety of media for expressing themselves when teachers suggest telling the same story in another way, for example, and when they provide a variety of materials to be used for this purpose.

(6) *Use distancing behaviours in ....*

Children's problem-solving capacities need not be artificially limited to the so-called 'cognitive' areas. Representational thinking is needed in understanding why certain rules have been set, resolving disputes with other children, estimating physical prowess, and evaluating one's own preference as well as in learning about numbers or colours. Since the underlying processes are the same, teacher strategies can be expected to be similar. Questions are used to explore with the child why he thinks it is alright to take all the crayons or how he knows he will be able to run all the way across the play yard without stopping. The physical environment, likewise, will influence the child's developing ability to think rationally about these areas.

The result of the distancing approach to the preschool classroom is a child who interacts with his environment independently, co-operatively, and thoughtfully. Not only does he tend to use whatever capacities he already has for such interaction but he is in an optimal environment for further developing and refining his abilities. It is an exciting and challenging environment for both children and teachers.

EXAMPLES OF LESSON PLANS USED IN THE PROGRAMME

Eight different lesson plans are included here to give an idea of how the general principles for teaching have been applied to specific activities during the past year. The first five plans are for large group activities times when all children gather together. These include examples from the planning time at the very beginning of the day, from the middle of the day after a 45 minutes free play period, and from the end of the day (following a second free play period).

Small group activities (2–5 children with one teacher) were done during free play periods, sometimes in a corner of the classroom and sometimes in an adjacent room. An example of a block construction activity has been included as a representative of the kind of planning done for these periods. Other formal and informal small group activities have dealt with topics such as reversible and irreversible transformations, story reading with predictions, anticipations, and speculations about the story line, guessing games, work on expressing an idea in a variety of media, observing and comparing, planning (e.g. deciding how the socio-dramatic play area can be made to represent a rocket ship) and understanding social rules and conventions.

The free play period is a crucial one for the implementation of distancing strategies. Planning has been somewhat less formal here than for group activities since the emphasis is on child initiated activities rather than on topics introduced and organised by the teachers. As the two plans illustrate, however, teachers anticipate possible directions for the free play period and generate questions that are likely to be helpful in activating representational thought.

Example 1
Large Group
Monday – Thursday, March 28–31, 1977
Activity: Circle 1
Focus: Planning

This planning time remains essentially the same as described in the plan for 3/21–25. Another type of questioning may be entered into interactions with some children. That is, questions requiring the child to bring to awareness reasons behind his selection of a particular place to play, e.g. 'O.K, you've decided to make a motorboat with blocks. Well, what made you decide that you wanted to do that today? ...' (Teacher may need to help the child with some possibilities) 'Did you think about how you were going to play on the way to school?' ... Did you ever see a motor-boat? ... Have you ever ridden on one? ...' The child may give reasons based more on the immediate environment, e.g. 'I want to play with Legos 'cause Timmy is there.' Teacher may help him to explore the variations of this basis. 'What if Timmy was in blocks ... paints ... records? Where would you play then? ... What if Timmy wasn't here?'

Also, if a teacher becomes aware of a child who changes his or her mind at planning time or during the morning, she can help him to bring reasons for that change to consciousness, e.g. 'Oh, I see you've left the puzzle, and gone to the magic markets. What made you decide to do that?' She may need to stop the child and have him mentally reconstruct his play in the original area. 'Who were you working with at the puzzle? ... What was each of you doing? ... And, look here, you are at the art table now. Think, and remember what made you decide to come here.' She may,

again need to offer suggestions. 'Did something happen at the puzzle that made you want to leave there? ... What? ... Did you look at the art table and see something here that you liked? ... What?'

These questioning strategies will help the child to become more aware of the reasoning processes behind his decision making. In turn, this awareness can help her to be more consciously selective when planning and more able to stand back, look at a problem, weigh possibilities and come to a reasoned decision. Through required planning, we have made children more or less look at the problem but before they can do much weighing of possibilities, they need to be made aware of the processes involved.

Example 2
Large Group
Thursday, January 20, 1977
Activity: Circle II
Focus: Decision making and idea assessing in a story line.

Objectives for Child

(1) Decide if X is a reasonable thing to take on trip.
(2) Come up with explanation for a decision.

Prerequisites for Child: None

Materials: 2 puppets

Teacher Preparation: Seat children on rug and prepare for listening.

Teacher Strategies

Teachers operate puppets who are deciding what to bring with them on a train trip. One plays 'dumb', suggesting a variety of things many of which are not practical for one reason or another. Second puppet says 'Oh boy, that's not a very good idea. V., can you tell him why? What would the problem be?' Conditions may include cold and snowy weather. The trip is 5 days long. Puppet has only one seat's small storage area on train. Suggestions given by puppet might include: his bed, ice cubes, an empty glass, bike, bathing suit, telephone, paper, record, etc.. Children will also be encouraged to think of other things they could bring to make original items workable, e.g. can of soda to go with empty glass. Puppet will ask for evaluations and reasons from individual children instead of entire group so that less outspoken ones can get a chance to think and share. Some suggestions given by puppet will be practical ones.

Rationale

(1) Puppets are a good way of holding attention of children.
(2) Children are required to make decisions on the basis of given conditions and their past experiences.

(3) Children required to bring to awareness the reasons for their decisions.

Example 3
Large Group
Monday, November 1
Activity: Circle III
Focus: Irreversible transformations: combining wet and dry (making play dough)

Objectives for Child

(1) To be aware of state of untransformed materials – to note particularly the colour and texture.
(2) To anticipate and predict result of combining wet and dry.
(3) To compare and verify predictions to actual results of actions.

Prerequisites for Child

Some experiences with mixing materials of different textures. Wetness is helpful but not necessary

Materials: (for each teacher)

6 C. flour
1 C. salad oil
Enough water to make dough soft and pliable
Large bowl
Measuring cup
Spoon
Orange food colouring

Teaching Preparation

Children are split into 2 groups – one going to block area. This is to make it easier for all kids to touch ingredients, participate in predicting transformations and verify the result of mixing wet and dry.

Teacher Strategies

(1) Ask about properties of unmixed ingredients – have children first describe, then feel, smell, etc..
(2) Ask about children's other experiences that might help them anticipate what the results of combining ingredients might be – e.g. ask about experiences helping someone to bake or mixing with water and sand or dirt.
(3) Ask children to describe the changes they saw in previous experiences – odour, texture, what could be done with combined vs. separate ingredients.

(4) Ask for predictions about the ingredients at hand – get kids to be specific about *what* will happen and *why*, i.e. why they think it will happen. (If reason given is that it worked that way before, ask if that is always the way it happens.) If it comes up, teacher can also ask about adding different types of liquids to flour, adding dry ingredients to flour, or adding semi-soft media such as cottage cheese, butter or clay. Keep children's predictions in mind for later experiments with combining ingredients.
(5) Get children to describe changes as they occur. This ensures that they observe relevant aspects of the transformation.
(6) Ask children to compare product with (a) the initial ingredients and (b) the predictions they made.
(7) Ask children about what they might do with the completed product when it is available to them during free play.

Rationale

(1) This experience can be reconstructed through dramatic play in bakery area.
(2) Aspects of this experience can be used to predict transformations in bread-dough making experience next day.
(3) Children are likely to have had relevant experiences they can draw on to make plausible predictions e.g. with dough or like materials such as dirt and water, shampoo and water, and chocolate and milk. This makes it easier for teachers to concentrate on helping children to use past experiences to solve a present problem.
(4) Since transformation occurs in a short period of time while kids are present, verification is easy and clear. Children can actively participate.

Example 4
Large Group
Wednesday, February 2, 1977
Activity: Circle II
Focus: Generation and evaluation of ideas about ways to be friends.

Objectives for Child

(1) To understand plight of child in story.
(2) To think of possible solutions to child's problems.
(3) To evaluate generated and given ideas in terms of their own feelings.

Prerequisites for Child

Some experience in a group of children.

Materials

Teacher-made easel story about a child who is trying to make friends with other children.

Teacher Preparation

Seat children on rug and prepare for listening.

Teacher Strategies

Story tells of a child thinking about how she wants to be friends and/or play with other children and her attempts to do those things. She first tries to gain friends by pushing, grabbing or hitting. Real children anticipate results of these actions and why those results are likely. They are encouraged to put themselves in the position of the child in story. How would they feel as the first child and as others. Some negative results of aggressive actions are shown in story and children suggest alternative actions, again thinking of what they might do if they were the first child, and likely results in relation to other children. Wording such as 'If you were in *this* class and you *really* wanted to play with someone, and she was playing with the clay, how could you get to play with her? ... Would you grab the clay? ... What do you think would happen? ... Would you hit her? ... What if someone hit you like this child did? ... Would you feel like being that person's friend then?' is used.

Story goes on to show some strategies used by the first child that were not aggressive and might be successful, e.g. asking, or watching and giving an idea.

Story will emphasise the actions as attempts to get attention and be friends – not as 'hitting' which is often associated with being negative.

Rationale

(1) Some children seem to need help in thinking of ways to begin to play with others.
(2) Anticipating results of actions in terms of your own feelings.
(3) Generating ideas about successful ways to play and be friends.

Example 5
Large Group
Anyday, February 8 through February 17, 1977
Activity: Circle III
Focus: Conservation of meaning. Responding to directions given first verbally than in sign language.

Objectives for Child

(1) To understand and comply with both sets of directions.
(2) To be aware of what is the same about both sets, i.e. the meaning.

Prerequisites for Child

Presence at some experiences, involving sign language as Circle II, Feb. 7, 1977.

Materials

Tape recorders.
Tape containing various directions for children to follow.

Teacher Preparation

Pre-record directions.
Learn signs for concepts on tape recorder.

Teacher Strategies

Children are allowed to listen to and act with directions on tape. They will be simple motoric ones such as 'sit with your legs crossed ... stretch out your legs ... cross your ankles ... stand up ... stand on one foot ... while I count to 5, hop ...' etc.. They must be directions which the teacher can duplicate with sign language. When tape of about 3 or 4 minutes is complete, children are told to watch and see if they can know how to do these things without hearing the words. The are asked to recall the story *The Good Birth* and how we told that story without words. Teacher may tell children the meaning of some of the signs and have them come to the meaning of others. She may ask why they think certain meanings apply to certain signs.

Rationale

Children work with 3 modes of representation – almost at the same time (verbal, sign and motoric).

Example 6
Small Group
Week of January 24, 1977
Activity: Block construction. Based on the book *Changes, Changes.*
Focus: Reconstruction of structures in book with available materials.

Objectives for Child

(1) To decide with the group which structure they would like to build.
(2) To select and position blocks needed to do that.
(3) To think of any changes needed on basis of materials or desired and carry them out.
(4) To be aware of some similarities and differences in book and real structure.

Prerequisites for Child

(1) Some experiences with unit and large blocks.
(2) Some familiarity with *Changes, Changes.*

Materials

Blocks, small and large
Book, *Changes, Changes*
Any others that children decide they need while building.

Teacher Preparation

Share the book with entire class before having any small groups. Make sure that all children are aware of supply of small blocks that are inside the cabinets.

Select 2 to 4 children for a group (number depending on which children and wishes of individuals).

Teacher Strategies

Teacher tells children that we are all going to pretend to be the people in *Changes, Changes.* 'Which one of these things are we going to make? ... The fire engine? ... Oh, Oh, who remembers why they had to build a fire engine?' Teacher may help all children agree on which thing to build now. They find picture of that structure in the book and talk about all the parts it has. Depending on kids in group, they may want to plan which of our blocks will correspond to ones in picture and/or decide which children will build which parts. As everyone is building, teacher may ask questions about parts of building; what they are for and how children can represent them. Probing individual parts of representation may be deeper here as it can require thinking that is directly related to what the child is doing. Teacher may help the child to anticipate – 'Well, if you put those three skinny ones here, how will you put on this roof? ... What if it is too heavy? ... Can you think of a way to use this and make it work?'

Rationale

(1) Reconstruction from graphic to 3-dimensional mode of representation.
(2) Problem solving around somewhat different materials and unrealistic situations represented in book.
(3) Divergent thinking in adding any changes that children think appropriate.

Example 7
Free Play
April 13 – 22, 1977
Activity: Block and socio-dramatic areas.
Focus: (1) Construction: Representation of objects using blocks and other materials.
(2) Socio-dramatic: Representation and extension of experiences and ideas through pretending.

Objectives for Child

(1) To decide which item(s) will be represented.
(2) To think about parts of item and plan how they will be represented.
(3) To solve problems presented by teachers or other children concerning construction.
(4) To represent situations, stories, etc. through blocks, other materials and pretending.

Prerequisites for Child

To have explored physical properties and attributes of blocks and other S.D. materials.

Materials

Large and small unit blocks.
Long boards.
Several cardboard boxes.
Machine parts.
Large cloth.
Other classroom materials as children see fit.

Teacher Preparation

Generally this just involves having materials available to children. Some days it may extend to creating things that suggest ideas to children. For example: A large 'M' after a trip to McDonald's, a certain way of using blocks and boards to create a roof.

Teacher Strategies

Depending on the child, his level of development and interest, strategies may include helping the child decide what he/she is going to build, the parts of that item, and/or how they can be represented. Or, asking children about construction after it is build, possible presenting problems, e.g. 'What happens in your house when it rains? ... Is there anything you can do about it?' Strategies also may include helping children to plan dramatic play – characters needed, their role, how they work together, etc. and/or extending play after children have begun it. Entering play actively, helping it along and withdrawing whenever possible, allowing children to continue

alone. Questions may be used in posing problems to children or teacher may just add a new element or situation herself.

Rationale

(1) Children in class vary as to abilities in construction and dramatic play. Teacher must be flexible and able to change strategies according to individual.
(2) Blocks are an effective, enjoyable mode of representation.
(3) Dramatic play often flows easily out of block play. These areas are combined as strategies can vary depending on children.

Example 8
Free Play
April 13 –22, 1977
Activity: Easel
Focus: Exploration and reconstruction with a new media – water colour paints.

Objectives for Child

(a) To explore the effects of using these new paints at the easel.
(b) To represent objects with paints.

Prerequisites for Child

Experience with easel and poster paints.
Introduced at Circle III of 4/12/77.

Materials

2 boxes of water colour paints
2 paint brushes
2 small containers of water
Large construction paper

Teacher Preparation

Introduce new materials at 3rd circle of previous day.
Have materials out at easel.

Teacher Strategies

While children are exploring new materials, teacher may ask questions about attributes of these paints such as colour or texture, how these paints differ from old poster paints in attributes, results when used, results of combining colours or of using varying amounts of water. If children appear to be interested in reconstructing a certain item, teacher may ask questions about that item – where the child has seen it, the parts of it, shapes, sizes, colours of parts, etc..

Rationale

(a) Children have been working with poster paints at easel all year. Water colours provide a different media with a wider variety of colours and a new texture.
(b) Because of the thinness and colour range, water colours may be an easy media for representation.

PLACE OF THEORY IN EARLY EDUCATION PROGRAMMES

Preschool programmes working from fundamentally an enrichment perspective and with the purpose of fostering cognitive development have evolved a number of programmes with particular foci (Evans, 1971). Each of the programmes, while basically trying to achieve the fundamental objective of ameliorating the intellectual consequences of poverty, employed different strategies to accomplish the same goals. Programme builders varied in the thoroughness with which they conceptualised the *how* and the *why* of educational intervention. Not only were there limitations in this regard but also in the evaluation.

If intervention is a process which is presumed to influence the course of development, the intervention is a process not unique to or applicable only for underprivileged children. All educational efforts can be construed as *interventions* since every programme does attempt to modify the course of cognitive, and/or social and/or emotional development.

Of course the argument that *all* education is interventionist argues that the course of development is *not* fixed but modifiable. For some, this proposition is open to question. My contention is that the rate and quality of intellectual growth is influenced by the quality of social and emotional experiences.

Alhtough there is evidence that those early programmes were effective in varying degrees, we are not clear as to why. My interpretation of this state of affairs is that the reason for such limited understanding of the 'why' or the outcomes is because of three fundamental reasons:

(1) the educational model was incomplete;
(2) the monitoring of the application of the model was usually not systematic; and
(3) assessment procedures were usually minimally correlated or totally uncorrelated to programme goals and procedures.

In this paper, each of the issues is discussed briefly and a model is then provided as an exemplar of preschool programme which does follow these guidelines.

TYPES OF DECISIONS REQUIRED FOR ESTABLISHING A CONCEPTUAL MODEL

At this stage of our educational science, a number of educational models are available. The question is how should the model of choice be selected. There are five types of decisions that have to be made in creating or selecting a conceptual model for preschool programming.

These are decisions of *what, when, how, who* and *where.* The issues are well identified by Evans who says:

> ... issue of *what* concerns the content of a program .... This range involves several dimensions including type of content and degree to which content is structured by adults for children's learning encounters. The *when* issue in early childhood education concerns timing or the sequential management of experiences appropriate to the developmental process. This issue cannot be separated from the problem of content, for it involves a determination of what experiences are most appropriate at what points in time. Both issues raise the broad philosophical question of long-range goals for early education .... Other problems related to timing concern the stability of early learning and the possible hazards of beginning too early or too late and the extent to which behaviour can be boosted by early intervention programs .... Fused to the issues of content and timing is the issue of *how.* This involves a set of questions concerning methodology valid for early childhood education whatever the purposes of such education might be. Teaching methods suitable at one stage of development may not be suitable at earlier or later stages. Methods which contribute to early mastery may not be suitable at earlier or later stages. Methods which contribute to early mastery may not be appropriate for long-term objectives .... The variety of methods applied to early childhood education is remarkable. To the above triad may be added the fourth issue, one that concerns *who will prosecute* programmes of early childhood education (Evans, 1971, p. 20).

The fifth issue, *where,* also needs resolution since a number of alternatives exist – a home-based programme, a school-based programme and so on.

Evans cogently forces the issue, namely, the definition of the conceptual or theoretical base for the programme:

> Decisions related to these problems [*what, when, how, who* and *where*] inevitably reflect variations in philosophy and psychological conceptions of child development in learning, availability of personnel, and the formulation of day to day practices. But perhaps the most overriding question relevant to the five issues above is the

> *why* question. For example, as a given programme is reviewed, one may ask why this content as opposed to something else? Why is a set of experiences provided at a given point in time? Why is this method of execution particularly preferred over other possible methods or techniques? Why are certain skills established as more imperative than others? (Evans, 1971, p. 21).

FUNCTION OF ARTICULATED CONCEPTUAL SYSTEMS

Evan's six questions of *what, when, how, who, where,* and *why* provide the guides for programme analysis; they require definition of assumptions, content areas, methodologies, and evaluation procedures. Analysis guided by these questions can reveal that the conceptualisations pervade every phase of the programme from teaching strategies to the nature of the subject population. In this way, the determination of the degree to which the programme components interlock becomes possible.

An explicit framework also facilitates evaluation of the programme. By clear identification of the *why,* the *what,* the *when,* and the *how,* logical or empirical analysis of the programme becomes possible. Measurement of programme components requires a priori definition of the variable to be assessed. In this way, assessment of outcomes becomes logically and psychologically related to inputs.

In sum, the greater the degree of explicitness, the greater the opportunity for programme coherence. The more adequate the identification of the dimensions involved, the greater the degree of coherence between inputs and outputs. On the other hand, when conceptualisation is not explicated or is vague or haphazard, it is likely that the programme will express disorganisation and thereby preclude the identification of coherent and relevant dimensions. The clarity of a conceptual framework is hypothesised as resulting not only in a more consistent programme but also as providing criteria against which to assess the novel and unexpected.

Advocating an explicit framework at this time does not define the programme. The time is not yet here for dogmatic adherence to particular programmes. Now is the time for evaluation studies which provide empirical bases for developing appropriate matches between theory and practice.

These studies, however, will not solve the fundamental question of *why* a particular programme. Such a decision borders on a *value* question which will have to be determined on the basis of programme objectives. If the goal is to prepare children for public school, then one type of programme may be called for; if the prime objective is to facilitate socialisation, then another type of programme may be advocated.

Does this imply that no single programme will emerge? The answer to this question is 'yes' since outcomes of programmes are predicted on the principle that societal values will determine programme choices. In

a pluralistic society theoretically, at least, placing high premium on individual differences, programmatic variation is to be expected. This assertion is based on the fact that the human organism is plastic and adaptable rather than preformed and fixed. Preschool experiences may shape development in ways compatible with cultural values. This assumption is expressed in programmes for preschool education found in the USSR (Chauncey, 1969). Research contributes by demonstrating effectiveness of programmes in reaching desired outcomes. Value objectives should be distinguished from research goals. This paper is concerned with the research requirements.

If developmental theory should guide programmatic decision-making, what theory should serve as the prototype? Can the selection of a theory be made independently of the value question?

These two questions are intimately interwoven. Advocates of particular perspectives argue cogently for their viewpoint but rarely express the value base for their choice. Kohlberg (1968), for example, in an excellent exposition of a Piagetian-based cognitive developmental theory, compares his theoretical orientation to the maturationist or learning theories by demonstrating implications of each. He clearly reveals why he selects Piaget on logical grounds but does not explicitly state his value bias. Staats (1968) formulates a concept of hierarchal learning using an S-R theory. Kohlberg and Staats do not explicate their belief system which forms the basis of their theoretical persuasion. Rather, they present a logical rationale for their choice, selecting evidence which supports their position. Of course, this is probably true of all theorists. Skinnerians reject and may not even read research in a Piagetian framework and vice versa. Reese and Overton (1970) state the case clearly when they say: Theories build upon different world views are logically independent and cannot be assimilated to each other. They reflect different ways of looking at the world, and as such are incompatible in their implications (Reese and Overton, 1970, p. 116).

Further, they show that:

> The crucial difference (between behaviourists and Piagetians, for example) is so fundamental and broad in its implications that syncretism is impossible and the only rapproachment possible is like the parallel play of preschoolers in that the protagonists are separate, but mutually tolerant ... the frequently discussed search for a "common language" in psychology can reasonably occur only within models. Across models there can never be a common language because the very nature of the different models dictates different language (Reese and Overton, 1970, p. 116).

Selection of models for preschool follows the same dictates as for general theory building. The choice depends on the world view of the

programme builder. Once the decision is made the *what*, *when*, and the *how* can be determined.

CONCEPTUAL CONSIDERATIONS REGARDING DEVELOPMENT

The first consideration is based on the proposition that the human organism is made up of a variety of subsystems: the perceptual system, the cognitive system, the sensorimotor system, the language system, etc., each of which has a relationship one to the other. Many programmes point with particular emphasis to some of these systems with minimal consideration, either theoretically or practically for other components. For example, there are programmes which stress the language system. There are others which stress the perceptual system. There are others which combine the cognitive and language systems. The question is what is the relationship between these various systems? All programmes are complex entities so that even emphasis on a particular system is not total. Consequently, teachers, programmers, and evaluators must be sensitised to the developmental issue of programmatic factors which influence the effects of the particular system selected as the target. Conceivably, facilitative or inhibitory effects may occur.

Related to the above question is the consideration of the relationship between systems longitudinally. We are not certain what the relationship is between systems, particularly in programmes which attempt to accelerate particular systems, especially in long-range terms. There are certain general considerations which are accepted. For example, while there is an increase in the capability of the organism to function on conceptual levels, he still responds in a more habituated manner to certain areas of life which elicit sensory motor responses. That is to say, the differences in acquisition of certain skills and competencies and the relations of these acquisitions to other aspects of the organism may vary over time. Thus, one cannot presume that such intersystemic relationships will be comparable from one period of life to another. If one views development as a system of hierarchically integrated structures which incorporate previous experiences, then one has to conceptualise and examine how the organism co-ordinates these various cognitive or affective structures from one point in time to another. The assumption that comparable interaction between systems will occur at each developmental level is not warranted. Thus, it may be, for example, that language training at a certain point in time may facilitate the development of thought. It may well be that language acquisition at another point in time no longer serves this function but serves other functions, e.g. the social relationship. Thus language acquisition is functionally different in the organism's life space at different time periods. If this perspective is part of the programme builder's conceptual orientation, then he may be in a position to examine the question empirically and there is a need for such data. Thus, we ask

what is the relationship between systems and within systems, both cross-sectionally and longitudinally. The question of systemic relationships in the temporal context brings up the next point, namely, the timing of intervention.

Increased argument is expressed for the proposition that the earlier the intervention the better, as if to say, if you get the rocket on course at the beginning of the flight, the trajectory will remain as expected for the long haul. Aside from the fact that we know there is constant monitoring of that trajectory in rocketry and constant adjustments made, educators somehow do not necessarily accept this analogue. Rather, the assumption is that early experience will or can have long-term effects even if the total environment is not changed. There is little evidence to support the notion that the earlier you start the better. This belief implies a certain commitment to primacy and the establishment of appropriate orientations, skills and structuress which will result in appropriate resolution of subsequent problems. The question still is the *when* of intervention. The issue is theoretical. The *when* of intervention requires identification of the significant epochs wherein particular interventions would have more relevance in getting the child on the appropriate 'course' of growth. It is unlikely that one would proceed to teach an infant to be a track star. This, of course, has a ludicrousness about it which we can all understand for we seem to have some feel for the requirements of being a track star, and we also have some understanding of the infant's capabilities. However, the issue is one of the principle that we tend to pay too little attention to, namely, when certain interventions should be undertaken and what their content should be. In other words, the timing of input for compensatory activities, irrespective of the developmental model, has to be carefully monitored in terms of its appropriateness. In essence, the fundamental problem is the determination of when intervention occurs and what this does to the vertical and horizontal intersystemic relationship.

Assimilation/Accommodation

A related issue concerns the degree to which the children can assimilate and accommodate to the programme. This capability is not only a function of the developmental level of the child but also of the type of experiences involved. The variety, the intensity and the extensity of the stimulation are part and parcel of the basic issue before us. Much work has to be done on the information processing capability of the developing child in relation to his developmental level. For efficient and effective programming, this issue has to be met head on. Careful assessment of the relationship between input and output becomes germane.

Let us turn to some developmental issues relevant to outcomes. There seems to be a general belief that development is overall a cumulative process in which experiences in T1 influence outcomes at T2. The cumulative impact, however, may express itself in various effects at different

times. There may be developmental periods which are consolidations of previous experiences and which at that time may be independent one of the other. Certain cognitive skills may be independent of each other in early childhood but not later. It is conceivable that the combination of T1 experiences will influence behaviour at T5. For example, one can conceive of such variables as perceptual motor skills which, when combined with symbolic activity, enables the child to read. With either of these not present, he could not learn to read. Thus the cumulative effect and the co-ordination of these two domains enables a third skill to develop. This speaks to the fact that development, although cumulative and continuous, does not only influence particular outcomes in the immediate but also in the long term since additional knowledge is acquired.

Another way of examining this issue of cumulative impact and antecedent-consequent relationships is the concept of stage setting properties of experiences. This is best exemplified by some physical growth phenomena which set the stage for certain outcomes, thereby participating in a means-end relationship. Walking, for example, is an outcome which occurs when the child has reached certain physical and motoric capabilities wherein he can balance himself and control certain body movements. As a consequence of this achievement, the child's perspective of the world alters and he has a new set of competencies to co-ordinate. In the course of this, he also begins to have a vertical orientation towards the world. Walking does not cause a vertical orientation but walking enables a child to alter his perspective of the world. Furthermore, it sets the stage for a host of other behaviours which become derivative of such a vertical view of the environment. To be more explicit, vertical views of the world have some impact in body orientation in space. Again this is not caused by walking. Rather, walking enables the outcome to occur. The stage setting concept speaks to the fact that certain phenomena occur which set the stage in a preparatory sense, thereby enabling the organism to accomplish other types of tasks.

Yet another theoretical question of interest is the degree to which certain competencies or structures are susceptible to modificaton; that is, they may be reversible or irreversible, extended or not extended. In a sense, this is the old question that was discussed under the guise of maturation and learning. Are there some organismic characteristics which once acquired cannot be altered? Once the child has learned to speak in the normal course of events, is this a reversible or irreversible process, and if so, under what conditions? On the other hand, certain perceptual phenomena such as the perception of illusions may not be modifiable. For those who espouse a Piagetian type position, modifiability can only occur when the individual has the necessary cognitive structures. It is not the situation where you can teach anything to anybody at anytime, even if you do it properly. To do it properly would mean not to teach it at that point in time because the organism is, in effect, not ready. Once these

things are acquired, however, can they be modified either by eliminating them or accelerating them? If they can be modified, can they be modified in an accelerative fashion by enhancing and increasing complexity or could they be modified at the same level but merely broadened; or are some processes irreversible and once acquired cannot be undone?

Child and the Environment

Another perspective is also relevant, namely, the relationship between the child and the broader environmental context. If intervention refers to alteration of the expected course of growth, other things being equal, then intervention programmes are potential sources of considerable disequilibrium. The child begins to live in two cultures: the culture of the intervention programme environment and the culture of the home. This is not the cliche issue of conflict of home and school so commonly discussed among middle-class educators. Rather, it refers to the funadmental lifestyle changes for the child and for the parent. Generally, the intervention proceeds not only to alter the anticipated course of the child's development but also the ongoing patterns of parental behaviours, attitudes and fellings. Imbalance is created by changing both participants, with the change of the parent towards greater orientation towards the child and vice versa. The parent is now regarded as a critical instrument in the child's growth. In fact, it is this relationship that defines the parent's place in the intervention programme. The child now becomes the centre of attention and the parent's behaviours are in need of change to support and maintain and perhaps instigate modifications in the child. Restructuring of the equilibrium in the family introduces the set of change variables that need careful definition and assessment. The assertions above are based on the view of the family as a social system which, by virtue of its sociocultural bias, has developed a set of bondings that keep it in a state of dynamic equilibrium. It should be kept in mind that in spite of assertions of disorganisation and disarray of the so-called economically disadvantaged families, this view, even if true, does not deny that some type of balance exists which contributes to some of the solidity of its organisation strength despite the stress and strain.

Behaviour Patterns Change

Early education fosters alteration of behaviour patterns with the potential of modifying the child's views, expectations, and behaviours and response to significant others in his life. Consideration of this change necessitates consideration of concomittant response in the parent. The critical features here are in the timing of the change in each and their complimentary nature. If the child is becoming increasingly verbal, for example, and the parent has not proceeded to cope appropriately with this, a state of disequilibrium is created. The child's behaviour is, in effect, altered prior to the acquisition of appropriate response techniques on the

part of the parent. For these conditions, it is conceivable that learnings acquired in the nursery may be inhibited and extinguished. Thus, the timing of the modification of members in this system must be carefully considered in terms of their interdependence.

This familial issue, while in part a value and ethical question, speaks to a crucial conceptual problem. How to conceptualise the interaction and how to deal with it methodologically is still to be resolved. It may well be that the significant factors obfuscating results and behavioural and social change in the preschool may be due to the divergence between home and school, not in basic values so much as in the degree to which the two sets of behaviours are interacting in a way which preclude the creation and maintenance of change.

Implicit then in the above discussion is the need to conceptualise the family as one dynamic system interacting with the nursery school which is the second dynamic system. The degrees to which these two overlap or separate become, in my estimation, a significant factor in facilitating or inhibiting growth. The issue becomes particularly cogent with children coming from certain minority groups where family organisation may be highly variable and the particular kinds of organisation may have short-lived tenure. The stability or instability of the systemic arrangements in the family have conceivably important effects on the child and this may be much more significant than certain elements of the educational programme itself.

These assertions also accentuate the concern we must have for the social significance of intervention where the activities as defined by the programme may have certain positive effects on the child in the school setting but may have disastrous effects in the home situation. The degree to which the parents evolve coping mechanisms or modifications of their own behaviour to sustain and support these presumed new found gains in the children raises a question of considerably ethical, practical and theoretical interest.

One may extend this latter argument of systemic relationships to the broader environment but it seems to me the principle is clear: the child as a member of the nursery school group has an overlapping membership in other groups and the degree to which we can identify these overlapping memberships and the function they have for the child's development may well be a significant determinant of the kind and quality of success the child has.

There is no doubt that in early education, we are dealing with a host of complexities that our science has not been prepared to deal with. The challenge for developmental psychologists is clear. The need is to identify variables functioning in particular settings, create adequate measuring instruments (which have not even been alluded to), and monitor the relevant environment which can and no doubt does influence the very nature of the *what* the intervention programme does. If the child is on

course as far as the nursery school is concerned, chances are he needs other sustaining forces to keep him moving in the appropriate direction. When these consistent forces are not present, it is no surprise that the child may abandon his new found learnings and revert back to what was a more appropriate and comfortable earlier stage.

For me, it is very important to conceptualise not only the growth of the child but also the system within which he is functioning e.g. to be aware of and to identify the ecological systemic variables ranging from school room equipment and placement of equipment to the child's relationship to his own mother. Granted that although we cannot be as precise as workers involved in verbal learning studies appear to be, we must be increasingly precise; we must take the time to identify or at least to define the significant variables which we are looking at and examine these in terms of logical and necessary outcomes. In this way, we create the situation where the criterion outcomes, such as school success, are defined with such explicitness that the appropriate intervention programme determines the necessary and sufficient precursors for predefined outcomes.

THE MONITORING OF PROGRAMMES

The research designs in most educational programmes are pre-post models. Typically, children are assessed at the beginning and at the end. The teachers were trained to carry out the model. Usually inservice training continues with varying degree of thoroughness and/or regularity. The assumption is that the teachers are in fact carrying out programme objectives.

Two issues immediately arise in this area. (1) Are the teaching strategies, organisation of the classroom and preparation of materials articulated with the conceptualisation of the programme; and (2) Is there consistent monitoring of the environment to ascertain the coherence between theory and practice?

Why is there such a stress on minitoring the daily activities of the programme? Such minitoring is necessary where it is important to know if the programme is in fact being practised. Secondly, if interest is in explication of change, it is necessary to define those educational experiences they may be responsible for such change. Monitoring requires consistent observation of teacher behaviour, to be certain teaching strategies are coherent with the model—in effect the *how* of the programme. Further preparation and use of materials as well as organisation of the classroom complete the area that must be consistently surveilled. In this way, one facet of the *how* of the programme is determined.

Since in these programmes, programme evaluation is an objective, regular surveying enables the programme builder along with the teachers to institute corrective procedures, thus keeping the programme on track. Granted that this is an expensive and time consuming process, it is

necessary for research. Some system should also be employed in non-research situations if coherence is a desired objective. In effect, monitoring here is comparable to quality control in manufacturing situations.

APPROPRIATENESS OF EVALUATION TO PROGRAMME DEVELOPMENT

Many preschool intervention programme employed IQ tests, especially the Stanford-Binet, Form L-M, as the criterion measure of programme effectiveness. The hypothesis being tested was that an increase in IQ should occur as a result of the educational experience. It is perhaps more likely that the implicit reason for employing IQ measures was the belief that IQ scores of impoverished children are low because of environmental limitations. Providing an enriched environment such as preschool should lead to an approximation of the children's true intellectual level. If that logic prevails, should not such measures be used as the criterion for assessment of success at every grade level? After all, the children are being provided with enrichment and this enrichment should enhance performance. IQ scores, in fact, are probably used for reasons of tradition; they represent old tried-and-true measures especially as predictors of school success.

In spite of the seemingly rational basis for using IQ scores, my belief is that they are inadequate, in fact, irrelevant. The strategy employed in evaluating preschool programmes must be examined in the larger context of educational evaluation in general. For me, the only rational assessment of preschool programmes would involve procedures that are related to programme experience. The logic is the same as that employed in the evaluation of other educational programmes where the criterion measures are related to programme inputs. My hunch is that the reason that this is not done in early childhood education is that there is no agreement as to the content of the preschool programme. Thus, there are no achievement-type tests for preschool children comparable to those in upper grades. Lest it might be thought that an attack is made on a straw man, an examination of preschool assessment programmes is deemed to be an urgent necessity. From the perspective of the discussion here, there is no reason at all to employ IQ scores as criterion measures on the outcomes of educational programmes, except possibly to determine whether or not the individual child's lack of gain in a programme might be a function of his intellectual status.

Rejecting the IQ test as a criterion assessment test brings us directly to the issue of what are valid measures for assessing preschool children's education gains. Valid assessment of preschool programmes must employ assessment measures of variables directly related to the programme. Selecting tests which are not clear outgrowths of the programme may well miss the mark. This is not to be interpreted as creating tests which are direct and explicit outgrowths of the programme, allowing of the criticisms that

the programme teaches to the test. Rather, the principle is that the test as dependent measures should indicate whether change has in fact occurred in those areas which were educational targets. The principle is the one guiding achievement test construction. Tests, irrespective of their format, should demonstrate the degree to which the child has internalised the educational experience and is capable of applying it to a novel situation or set of problems.

Time does not permit discussion of additional assessment problems for preschool but reference is made to Weinberg and Moore (1975). The general issues focussed on this point have dealt with the need for conceptualisation, monitoring of programmes and deriving evaluation of variables for programme goals.

Now attention is turned to a discussion of our preschool programme at the Child Care Research Centre at Educational Testing Service which was guided in its design and organisation by the three issues described above.

RESEARCH FOR PROGRAMME AND CONCEPTUAL FRAMEWORK

In a series of studies beginning in 1965, we discovered that a large proportion of black children from impoverished backgrounds were less competent than their more privileged counterparts when dealing with representational material (Sigel, 1972a; Sigel, Anderson and Shapiro, 1966; Sigel and McBane, 1967; Sigel and Olmsted, 1970). These studies revealed that children from impoverished backgrounds had greater difficulty in classification tasks when the task items were coloured or black-and-white photographs in contrast to three-dimensional objects. Such discrepancies were found in spite of the fact that the children could label and recognise the pictorial stimuli. The issue becomes, then, not one of recognition but of *knowledge* that an object can be represented in several modes and still be a member of the same conceptual class. It is easy to confuse recognitory behaviour as equivalent to 'knowing' or comprehension of equivalence. Not only did these children have difficulty in responding equivalently to pictorial stimuli and their three-dimensional counterparts but they also had difficulty with other tasks involving representational skills e.g. motor encoding from the Illinois Test of Psycholinguistics and Dramatic Play (Sigel and Perry, 1968).

A review of the literature does not reveal many data specific to this issue but some can be reinterpreted to provide further evidence concerning the problem. For example, Kamii and Radin (1967) examined the types of Stanford-Binet items which children in the Perry Preschool Project considered difficult and found them to be conceptual items, as compared to the more rote perceptually concrete types. It may be that the reason IQ scores, so often used as an evaluation measure for intervention programmes, show a later decline is because the test items involve more conceptual-verbal items than rote-concrete ones. These data suggest then

that the generic problem is development of representational competence, i.e. the ability to deal with representational material. This is a capacity basic to any symbolic activity and considered by Piaget (1962) to be intimately related to thought.

Examination of life experiences of children from impoverished and deprived environments suggests that these life experiences reduce the opportunity for representational competence to flourish. For example, Hunt writes that 'children of poverty lack opportunities to develop cognitive skills' (Hunt 1969, p. 204). In referring to parent-children interactions he says:

> What these parents talk about is also lacking in such conceptual constructions as prepositional relationships, casual explanations, and concepts of space, time, and justice .... The parents of the slums not only talk less with their children than do parents of the middle class, but they seldom undertake to discuss with their children matters which prompt them to discern various kinds of relationships among things and people or to use language to describe these relationships (Hunt 1969, p. 205–6).

't is reasonable to assume that these kinds of experiences may be critical antecedents for the development of representational competence.

If the capacity to represent the environment or to symbolise is a generic human ability and if competence can be affected by certain kinds of life experiences, then a careful examination of experiences that facilitate or preclude representational competence seems in order.

We hypothesise that the most relevant experiences are those that would involve orientation to the environment by anticipation or objectification of temporal, spatial and causal relationships. It seems to us that certain classes of socialising experiences function to 'demand' employment of representational acitivity. It may well be that the necessary and/or sufficient conditions that set the process of representation in motion are those that serve to create psychological, spatial or temporal distance between person and object. These behaviours (social and/or non-social), referred to as *distancing behaviours* are the class of events that create psychological distance between ostensive reality and its reconstruction (Sigel, 1970). Thus, the basic hypothesis emerged, namely, exposing children to distancing behaviours should enhance the development of representational skills.

Distancing behaviours, however, will be effective stimulants only if the recipient is motivated to engage and to interact with the significant person or event. Exposure without the prerequisite willingness to participate precludes any effect. To create such a climate necessitates an environment in which significant adults are warm, accepting and sensitive to the child's status. Adults should be able to listen, appreciate the child's pers-

pective and be 'tuned' into his comprehension level. Thus, the adult must be able to assess the child's developmental level and respond appropriately.

History of 'Distancing' Programme

The programme was initially employed with two-year-old children from impoverished backgrounds. The results of the project were encouraging, both in the short term and in the long term (Cataldo, 1977; Sigel, Secrist and Forman, 1973). In 1973, the programme was moved to ETS where it was applied to a middle-income group of children. The aim is to determine whether the conceptual model is appropriate for another group of four-year-olds.

Monitoring of the Current Programme

The key to the programme is currently identified in the degree to which the teachers employ distancing strategies. Since the differences between these experimental programmes are defined in the context of teaching strategies, it is necessary to accomplish two objectives at one and the same time: (1) to be certain that the teachers instructed in using distancing strategies in effect do so; and (2) to determine if there is a difference in frequency of such behaviours in a non-experimental set-up.

To accomplish this objective, we developed an observation schedule which was derived from the conceptual framework. It includes categories of distancing behaviours, those strategies teachers use to structure tests and finally child management.

Teachers were observed at the beginning, middle and end of the year for a total of 1½ minutes each time block. Teachers wore wireless microphones and did not know what time of day they were being recorded by videotape. The videotapes were coded.

These tapes were also shown to the teachers so that they could determine how they were doing and what correctives were needed. The teachers in the distancing programme were the only teachers to observe these tapes.

Comparing teachers in the distancing programme and the other non-distancing one, we found significant differences in frequency of distancing behaviours on the experimental group, as expected. Thus, we feel certain that the teachers are in fact carrying out the teaching strategies that are the keystone to the programme.

PERSPECTIVE ON EVALUATION MEASURES

The rationale undergirding our evaluation procedures is that they should be programme relevant. Thus the prepost battery assesses representational competencies which derive precisely from the objectives of the educational programme. Since representational thinking refers to the ability to create internal representation (images) that transcend the immediate, reconstruct the past or anticipate outcomes, reorganise events in any time domain and

Table 1
Distancing Strategies*

To observe**	Asking the child to examine to observe e.g. 'Look at what I am doing'.
To label	Naming of a singular object or event, e.g. naming a place, person, alternate. No elaboration. 'What color is the block?' 'Where is Joel?'
To describe	Provide elaborated information of a single instance. Descriptions are static; provide no dynamic relationships among elements, no use and functional characteristics (e.g. 'What did the car look like?')
To sequence	Temporal ordering of events, as in a story or carrying out a task. Steps articulated; last, next, afterwards, start, begin are possible key words. 'First we will look at the pictures, then we will make up a story' – teacher telling 'Your turn is after Paul's.' 'Are you next?' (sometimes confused with structuring as in 'Paul, it's your turn.')
To reproduce	Reconstruct previous experiences, dynamic interaction of events, interdependence, functions. 'How do you do that?'
To compare	Noting (describing or inferring) characteristics or properties.
(a) describe similarities	Noting ostensive common characteristics (perceptual analysis) 'Are those the same?'
(b) describe differences	Noting ostensive differences among instances (perceptual analysis). 'In what way are the truck and airplane different?'
(c) infer similarities	Noting non-observational commonalities (conceptual).
(d) infer differences	Noting non-observable differences (conceptual).
To propose alternatives	Offering different options, different ways of performing a task.
To combine	
(a) symmetrical classifying	Recognition of the commonalities of a class of equivalent instances. 'Why did you put those two together?'
(b) asymmetrical classifying	Organising instances in some sequential ordering – see the relationship as a continuum, seriation of any kind, comparative, where each instance is related to the previous one and the subsequent one, relative (big to small), (more or less).
(c) enumerating	Seriation: enumeration of number of things unalike; ordinal counting (1, 2, 3, 4, 5,). 'Count how many there are.' 'Is this tree bigger than that one?'
(d) synthesising	To reconstruct components into a unified whole; explicit pulling together; creating new form, sum of a number of discrete things.

* This is not an exhaustive list of strategies.

** Each strategy is a 'demand' for the child to engage in particular operations which are inherent in the structure of the statement. The 'demand' quality is implicit in the strategy. The form of the strategy may vary (see Table 2). The singular examples listed here are illustrative and not to be construed as exhaustive.

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transform ideas through various media, tests in the battery are obligated to tap these various functions. The test battery functions as achievement tests, evaluating the child's performance level at the outset of the programme and testing for change at the end of the school year. The presumption, of course, is that the educational experience accounts for the change.The experimental group should demonstrate more effective handling of the post-tests than the children in a conventional programme.

It must be kept in mind that the tasks in the test battery are unfamiliar to the teacher and the child, and are not in any way similar in content or in format to classroom instruction. We work with a transfer and generalisation model where the competencies fostered in the classroom are presumed to transfer and generalise to novel tasks in a novel setting.

The tasks are, in essence, problems derived from the programme; they therefore involve cognition of physical phenomena, cognition of social phenomena, logical reasoning, language (productive and receptive) as reflected in logical reasoning and conceptions of controlling or being controlled. Some of the tasks in each area are a follows:

Individual Tests

(A) Cognition of Physical Phenomena

Static reproductive imagery – the purpose is to observe and reproduce an arrangement of blocks.

Kinetic anticipatory imagery – to imagine where something might be.

Remembrance of causal processes – emplaining a phenomenon and remembering the procedure and the cause later.

Seriation of length – the logical problem of ordering items according to length.

Transitivity – logical understanding of relationships according to length.

Transformation of punctate (array of dots) stimuli into three-dimensional forms.

Conservation of volume and prediction of level when poured – tests of logical relationships and predicitons requiring inferential thinking.

(B) Cognition of Social Phenomena

Minischool test – assesses child's ability to reconstruct his everyday classroom environment.

Verification – assesses child's ability to verify actions or judgments when the proof is not in the immediate present.

Children's knowledge of social rules, conventions and authority.

Classification of people and conservation of social roles.

Solution of social problems.

(C) Language Assessment

Assessment of receptive language.

Assessment of productive language.

(Both deal with problems requiring logical operations.)

Reviewing these tasks and integrating them with the description of the theoretical model which undergirds the programme illustrates the relationship between programme rationale (conceptualisation), method (teaching strategies and classroom organisation) and evaluation (test battery).

The next issue is the analysis of data on such evaluation programmes. Herein lies another critical issue for determining whether the child has gained or learned from the programme.

PERSPECTIVES ON DATA ANALYSIS

The final problem facing researchers in this domain is data analysis. This is of course not the place to identify specific statistical procedures. Rather, the identification of some formal questions related to data analysis is dealt with.

Most programme effects are evaluated by comparing groups of children among different programmes or between experimental and control groups. Such analyses usually take for granted that every child in the programme has had equal exposure to the programme. Chances are that this is unlikely since amount of teacher time, for example, with individual children is highly variable. To argue that overall contact may average out may be adequate statistically but psychologically is not a reasonable perspective because *when* and *how* teachers interact as well as frequency are necessary bits of information needed to determine *whether* and *how* programme experience affects programme participants.

This concern is not raised to eschew group data programme analysis but to point out *one* major difficulty that exists in programme evaluation. This issue is more relevant for preschool and perhaps kindergarten than it might be for older children but at this point, this is raised as a general issue for all classroom research.

One solution of course is to obtain samples of teacher-child interaction and use such data to determine intensity and frequency of contact. Such data may provide relevant information which may help differentiate the children who gain from the programme (within programme analysis) as well as between programmes. This strategy may be particularly useful in those studies that find no programme differences when using group data.

A second related issue is how programme data are analysed. Obviously, just using single test scores would be limiting since they usually reflect only a partial set of outcomes, e.g. using an IQ score to attest to programme effects. Obviously, more is happening to a child in a programme than an IQ change. Currently, multivariate or regression models are used on the asumption these get at the interaction among various variables.

Yet these models are non-causative and can be atheoretical. In fact, their use does not require a causative model. One of two types of analysis is advocated: (1) a configuration model, and (2) path analysis where direction of effects is created and then tested statistically by a regression model in which predictions are stated a priori and weights generated statistically.

CONCLUDING COMMENTS

We have attempted in this document to pose some of the major issues involved in evaluating early learning experiences in group settings. Although we have used preschool as the case in point and illustrated the issues with the detailing of the programme currently in operation at ETS, we contend that the principles elaborated in this presentation are applicable to any learning setting.

Our argument is that unless there is coherence between concept, method and evaluation procedures, coupled with the analysis of group and individual programme effects, we would be committing the sin of commission, namely, applying irrelevant and unrelated methods to express a programme concept and also employ evaluation measures that in fact are not evaluating the programme in question. We feel continuation of current procedures leads to confusion about the source of outcomes or lack thereof in early learning educational evaluations.

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